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07/19/04 10:29 AM

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Subject: SLOP Scope of Work (SOW)

Jim and Tom,

Please find attached SLOP SOW for your review and comment. Please email me with your comments or concerns by 28 July 04. The SLOP technical team is currently plotting sample locations on maps in addition to developing the work plan. We will be forwarding these maps to you for your input in the next two weeks. We ask for your cooperation in a quick turnaround review in order for us to complete a draft work plan for your review in early August. As you are aware, the KC District drill crew is scheduled for two weeks beginning August 30, 2004 to perform the RI field work.

We also will be inviting both of you to meet with us after you review the maps in order to finalize sample amounts and sample locations prior to draft work plan finalization.

I understand the site visit last Thursday went well. The Corps staff obtained some useful historical information at the Archives across the street from SLOP the next morning on Friday. They made a copy of the St. Louis Ordnance Plant Floor Plans dated 7/14/42.

Thank you for your cooperation and support.

Sincerely,
Josephine

<<SLOP Draft SOW1.doc>> SLOP Draft SOW1.

June 2004

Scope of Work (SOW) for In-House Remedial Investigation (RI)

St. Louis Ordnance Plant (SLOP)
St. Louis, Missouri

1.0 SITE DESCRIPTION, PROJECT PLANNING OVERVIEW AND OBJECTIVES

1.1 Site Description

1.1.1 Background

A 280-acre ordnance plant was constructed in northeastern St. Louis between January 1941 and May1942. From 1941 and 1969, the plant operated as a government owned/contractor operated facility producing small arms ammunition. Hanley Industries, Inc. leased 14.7 acres of 28 acre parcel of the plant previously identified as Hazardous/Chemical Area No. 2 from 1959 to 1979. Prior to the Hanley lease, during World War II, the Hazardous/Chemical Area No. 2 was believed to be used for manufacturing of tracer bullets and primer, and explosive mixing and storage. The Hanley Industries used most of the buildings to load detonators, primers and to mix explosives. In 1979, following the termination of the Hanley lease, the Department of Labor demolished some of the bunkers and buildings on the Hanley site and expanded the adjacent Job Corps facility. As a result, the inactive remains of the Hanley area were reduced to 10.7 acres. This 10.7 acre area is the current area of concern and is the portion identified as St. Louis Ordnance Plant (SLOP). SLOP consists of approximately 35 buildings and warehouses, concrete blast walls and subsurface structures including basements, utility tunnels, sewers and powder wells. Since the area became inactive in 1979, significant degradation and vandalism has occurred. The 89th Regional Readiness Command (RRC) currently owns the property.

Several buildings on the site are currently leased to businesses. SLOP is surrounded by a residential area to the north, a Job Corps Center to the west, the Sverdrup U.S. Army Training Center to the south, and GSA to the east across Goodfellow Blvd. The long term site development plan calls for demolition of all existing structures.

Contamination resulting from past activities at the site consists of a metals, explosives, volatile organic compounds (VOCs) and asbestos. A Contractor working for the 89th Regional Readiness Command is currently removing asbestos from all buildings and subsurface structures.

1.1.2 Previous Studies

Numerous investigations were completed at SLOP between 1980 and 2003.

Battelle Columbus Laboratories investigated the Hanley Area in 1980. The investigation showed that building surfaces and waste handling system components contain explosives and metal residues. However, there was insufficient data to evaluate potential adverse impacts or determine cleanup requirements.

U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) completed an environmental study in 1991. Twenty-nine (29) surface soils samples were collected across the site to evaluate contamination potentially affecting surface runoff and windblown dust. Four samples were collected from within the tunnel system. A screening survey was performed and samples collected to determine the extent of asbestos containing materials (ACMs) within the tunnel system. Results

of the sampling indicated that surface soils were contaminated with lead at levels of potential concern. Water samples collected contained lead and explosives at levels of potential concern. The study recommended confirmatory sampling and asbestos abatement.

HARZA Environmental Services, Inc. completed a Site Investigation Report in 1998. The objective of the investigation was to determine the presence of VOCs, semi-volatile organic compounds (SVOCs), explosive chemicals and metals in site soils and sediments. Nineteen (19) shallow soil samples were analyzed from locations adjacent to nine buildings. Two (2) sediment samples and one (1) water sample were analyzed from inside a powder well. Two (2) sub surface samples were collected adjacent to a powder well and analyzed. Two (2) sediment samples were analyzed from sewers. The study determined numerous VOCs, SVOCs, metals and RDX and HMX were present in site soils and sediments.

TapanAm Associates, Inc. completed a Draft Preliminary Assessment/Site Inspection Report in 2001. The assessment evaluated the potential for contamination migration by surface routes through underground utility tunnels and the extent of surface soil contamination. The potential for groundwater contamination was also evaluated. Twenty-nine (29) surface soil samples were collected from across the site. Two (2) water samples were collected within the tunnels. Eight (8) sewer lines segments were inspected and recorded on videotape. Numerous breaks in the piping and obstructions were noted. Five (5) subsurface samples were collected adjacent to cracked powder wells or breaks in sewer line. Sixteen (16) temporary peizometers (PZs) were installed. Groundwater samples were collected from PZs but sample volumes varied do to low permeability soils. Five (5) groundwater wells were also installed and sampled. The assessment report confirmed the presence of contamination and concluded that groundwater and surface water pathways were not complete and did not pose a threat to human health and the environment. The soil and air pathway is limited to onsite workers and the population within 200 feet of the source. The assessment also identified VOC contamination in an off site up gradient well.

As a result of the off site up gradient contamination, Shaw Environmental conducted a Limited Phase II Environmental Site Assessment. Four (4) Geoprobes were competed and converted into temporary monitoring wells. Although several VOCs were present above detection limits, none exceeded maximum concentration levels (MCLs).

1.2 Regulatory Authorities

U.S Army Environmental Center (USAEC) will be the lead agency at this site with Missouri Department of Natural Resources (MDNR) and Environmental Protection Agency (EPA) Region VII involved in a regulatory oversight capacity. USAEC requested that the U.S. Army Corps of Engineers, Kansas City District (USACE) prepare a Remedial Investigation (RI). All documents and pertinent correspondence shall be submitted through USAEC to MDNR, EPA Region VII, and the 89th RRC for review and comment.

All RI activities are conducted under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). Additionally, the Defense Environmental Restoration Program (DERP), 10 U.S.C. 2701-2707, 1986, authorizes the Secretary of Defense to conduct response actions at sites contaminated while under the jurisdiction of the Department of Defense (DoD).

1.3 Project Planning Overview and Objectives

1.3.1 Site Strategy Development

The project team shall develop long term objectives for all activities at the site to include, but are not limited to, execution of investigations and ensure that specific data needs, to achieve site remediation and closeout, are accomplished. The team shall use existing information including applicable CERCLA guidance, historical data, operational history, and previous reports to develop technical requirements of the project. In addition, the Project Manager shall be responsible for the development and tracking of project management requirements such as schedule, budget, and review comments.

1.3.2 Project Objectives and Project Decision Statements

The project team shall focus available resources on data needs that provide the best value in supporting future site decisions and developing a comprehensive RI. Since project quality objectives (PQO) and data quality objectives (DQO) may be redundant, DQO requirements shall be defined below in Section 1.3.3. In addition, the project team shall develop Project Decision Statements. These statements shall be included in the Work Plan (WP) for each phase of work. These decision statements, from each work phase, shall be included in documentation relating to remediation and closure of the site.

1.3.3 Data Quality Objectives (DQOs)

The project team's efforts in defining DQOs will be critical to a timely and cost effective project closure. DQOs shall include, but shall not be limited to the following:

- Confirming and further delineating the nature and horizontal and vertical extent of contamination;
- Obtaining laboratory and screening data to determine future project planning decisions;
- Meeting risk assessment data needs;
- Assisting in the selection of an appropriate remediation technology that will meet established goals and meet the PARCC parameters;

The team shall ensure the data quality meets defined objectives required by EM 200-1-3, will support project decisions, and that the level of uncertainty is acceptable. The objectives shall provide the criteria by which the specification and collection of technically sound and defensible data can be obtained which can then be used for project decisions leading to site closure. The team shall plan and provide rationale for data collection in the Sampling and Analysis Plan (SAP). Additional rational and specifications used to define DQOs can also be included in the Field Investigation and Data Analysis sections, Tasks 2 and 3 of Section 1.4.

1.4 Summary of RI Tasks

Task 1 – Work Plan (WP) Preparation
Task 2 – Field Investigation
Task 3 – Sample Analyses, Data Assessment/Validation and Reporting
Task 4 – Data Evaluation/Fate and Transport Analysis
Task 5 – Baseline Risk Assessment
Task 6 – RI Report

1.5 References

- U.S. Army Corps of Engineers Toxic and Hazardous Material Agency (USATHAMA), St. Louis Ordnance Plant Environmental Study, Status Report, November 1991.
- HARZA Environmental Services, Inc. Site Investigation Report, Former St. Louis Ordnance Plant (SLOP), December 30, 1998.
- TapanAm, Draft Preliminary Assessment/Site Inspection Report, Site Characterization Report, Former St. Louis Ordnance Plant, October 2001.
- Shaw Environmental, Inc, Limited Phase II Environmental Assessment Report for the Investigation of Impacted Groundwater, US Army Reserve Center, March 20,
- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual

(Part B, Development of Risk-based Preliminary Remediation Goals).

- National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Appendix G, 40 CFR 300, 15 September 1994.
- U.S. Army Corps of Engineers (USACE), Safety and Health Requirements Manual, EM 385-1-1, September 1996.
- U.S. Army Corps of Engineers (USACE), ER 385-1-92, Appendix C, Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities, September 2000.
- Occupational Safety and Health Administration (OSHA) General Industry Standards, 29 CFR 1910, and Construction Industry Standards, 29 CFR 1926; especially 29 CFR 1910.120 / 29 CFR 1926.65 - "Hazardous Waste Site Operations and Emergency Response".
- U.S. Army Corps of Engineers, Kansas City District Accident Prevention Manual, KCDM 385-1-1
- NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", October 1985. (DHHS (NIOSH) Publication No.85-115)

2.0 PROJECT REQUIREMENTS

2.1 Task 1- Work Plans Preparation

The project team shall produce a Work Plan (WP) that will consist of a General Remedial Investigation (RI) Plan, Site Safety and Health Plan (SSHP) and a Sampling and Analysis Plan (SAP), which includes a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP).

2.1.1 Background Data Assessment

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The project team shall ensure that sufficient background data has been collected. Background data may include, but shall not be limited to, soil, sediment, surface and groundwater. If there is insufficient data to define background conditions for the site from the previous investigations, the project team shall ensure that background samples are collected during the next investigation stage. If required, background sampling shall be included in the Field Sampling Plan (FSP) section of the SAP.

2.1.2 Site Visits

The project team may conduct additional site visits during the planning and WP, SAP and SSHP preparation stages with the approval of the Project Manager. Once the QAPP and FSP are developed, the project team may conduct a site visit to ensure that the plan meets the delineation objectives.

2.1.3 Development of DQOs

The planning team shall develop a complete set of DQOs for the project. The criteria, for developing the DQOs are defined in Section 1.3.3.

2.1.4 Data Collection Design

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The project team shall identify soil, sediment, and groundwater sampling locations, numbers of samples and analytical requirements, i.e., screening, laboratory, in the SAP. Sampling plans shall use data from previous studies and the plans shall be designed to satisfy the data quality objectives. The SAP shall provide detailed descriptions of methods, procedures, materials and equipment proposed to accomplish the investigation. What about Field SAP locations

see 2.1.6.3 page 5

2.1.5 Work Plan Development

2.1.5.1 Cursory Risk Evaluation

The Project Risk Assessor, with support from the Project Chemist, shall ensure that sampling, analyses, and detection limits are adequate to support the future risk assessment activities.

2.1.6 Preparation of General RI Plan, SAP, SSHP, and Additional Documents

2.1.6.1 General RI Plan

A general Remedial Investigation Plan (RIP) shall be prepared in accordance with USACE guidelines (EM200-1-2) and serve as an umbrella document for all phases of the RI. The RIP shall provide the following general information: project purpose; site background and setting; previous investigations; preliminary conceptual site model; data quality objectives; project organization; team members and responsibilities; reporting requirements and deliverables; and overall task schedule.

2.1.6.2 SSHP

A SSHP required by 29 CFR 1910.120(b)(4)/29 CFR 1926.65(b)(4) shall be prepared by the Project Industrial Hygienist with support and review by the project team. Onsite activities shall not commence until the plan has been appropriately reviewed and approved by a qualified Industrial Hygienist. The SSHP shall describe the site-specific safety and health procedures, practices, and equipment to be implemented and utilized in order to protect affected personnel from the potential hazards associated with the site-specific tasks to be performed. The level of detail provided in the SSHP shall be tailored to the type of work, complexity of operations to be accomplished, and hazards anticipated. The Project Industrial Hygienist shall review all elements contained in Appendix C of ER 385-1-92 in preparing the SSHP. Information readily available in standard texts shall be repeated only to the extent necessary to meet the requirements of this SOW. The SSHP shall not duplicate general information contained in the District's safety and health program that is not specifically related to this project.

2.1.6.3 SAP

The project team shall prepare a complete SAP for the comprehensive investigation of the site. The plan shall consist of two parts, the FSP and the QAPP. These plans are the backbone of the investigation. The team shall ensure that the plans are designed to fulfill the PQOs and DQOs, Baseline Risk Assessment, Applicable or Relevant and Appropriate Requirements (ARARS), and Preliminary Remediation Goals (PRGs) requirements. The document shall be prepared in accordance with the guidelines provided in EM200-1-3, Environmental Quality Requirements for the Preparation of Sampling and Analysis Plans, and any applicable EPA documents.

2.1.6.3.1 FSP

A complete and comprehensive field investigation plan shall be developed .The FSP shall define field sampling requirements for the project. These shall include, but are not limited to, locations, drilling and sampling, field measurement well development, and other field requirements, and any other pertinent information required to accomplish the objectives of the investigation. In addition, the plan will include methods by which the quality of the data will be assessed and presented. Minimum requirements to determine the completeness of collected data will also be discussed.

2.1.6.3.2 QAPP

The QAPP shall define all analytical requirements for the project.

2.1.6.4 Quality Control Plan (QCP)

The project team shall prepare a QCP that shall be project-specific and fully describe the Quality Control program to be implemented during planning and execution of the project. The QCP shall cover work plan preparation and implementation of field activities and shall describe review methods, tests, procedures, inspections, documentation and other information as necessary to provide complete assurance that work will be conducted in accordance with acceptable standards of engineering and scientific practice. The QCP shall describe a quality control organization, independent from the project team with names of individuals and qualifications of those individuals. The QCP shall be approved by the branch Quality Control Program Manager.

The QCP shall be prepared using the following developmental procedures:

- Identify required end products.
- Identify each critical stage of development for which quality must be controlled to produce desired end products.
- Define acceptability criteria for each process, procedure, and product employed to accomplish each critical stage of development.
- Define methods to determine that acceptability criteria have not been satisfied.
- Establish corrective action processes where acceptability criteria have not been satisfied.
- Provide documentation that Quality Control has been accomplished.

2.2 Task 2 – Field Investigations

All investigation activities shall be conducted in accordance with CENWK standards and quality control protocols. Potential investigation activities may include, but shall not be limited to, the following:

- Soil Sampling;
- Monitor Well Installation; and
- Groundwater Sampling.

Building materials

2.3 Task 3 – Sample Analyses, Data Assessment/Validation and Reporting

2.3.1 Existing Analytical Data

A complete review of all data previously acquired at the site shall be accomplished by the project team. The applicability, acceptability, and usability of the data shall be determined. Any data deemed unsatisfactory shall be rejected prior to the development of the field sampling design package. This is to ensure that any potential data gaps due to unsatisfactory data are avoided and the quality assurance project plan (QAPP) and FSP are complete.

2.3.2 Data Evaluation

In the RI report, the data shall be evaluated with respect to the quality of the data and whether it fulfills QC and QA requirements specified in the Quality Assurance Project Plan (QAPP) and the Project Quality Control Plan (QCP), and does the data fulfill the PQOs and DQOs. The team shall ensure that all data is presented in a logical manner and where necessary supported with maps, diagrams, tables and other media, which shall assist in demonstrating conclusions drawn.

2.3.3 New Data

All new data shall be evaluated in accordance with USACE, EPA and MDNR guidance.

2.3.4 Analytical Procedures

All analytical procedures, methods and other requirements shall be defined in the QAPP section of the SAP. These procedures shall cover, but are not limited to, field screening, surface water and groundwater samples, surface and subsurface soils and any other media that may be defined for the project by the DQOs. The exact requirements shall be determined during the Data Collection Design phase of the process. air & building materials

2.3.5 Quality Assurance/Quality Control Samples (QA/QC)

All field and laboratory QA/QC sample requirements shall be defined in detail in the appropriate sections of the SAP. These requirements shall include, but are not limited to both field and laboratory samples. At a minimum, as deemed necessary, rinsates, field blanks, blind duplicates, matrix spikes, laboratory control samples, reagent blanks and laboratory blanks shall be analyzed for each applicable method.

2.3.6 Method Detection Limits (MDLs)

The team shall ensure that all MDLs meet the DQO requirements of the project. Even though the Risk Assessment is not being accomplished during the initial phase of the investigation, MDLs must fulfill any requirements of the future risk assessment.

1.1.1 Preliminary Identification of ARARs and Preliminary Remediation Goals (PRGs)

The project team shall identify and reference all applicable ARARs and PRGs. These shall be used as a planning tool to ensure that appropriate data is gathered during the next investigation. The RI report shall contain a complete listing of all Federal, State and Local documents applicable to the site.

2.3.2 Other laboratory requirements

Other requirements, such as turn-around time, sample handling and preservation, and holding times shall be defined in the QAPP of the SAP or in the Laboratory Quality Management Plan (LQMP) for the laboratory being used to perform the analyses.

2.4 Task 4 – Data Evaluation/Fate and Transport Analysis

2.4.1 Data Evaluation

2.4.1.1 Comparison to DQOs

All data shall be evaluated to ensure that it meets DQOs for the project. Any data that falls short of the DQO requirements shall be further evaluated to determine its usability with respect to the overall objectives of the project.

2.4.1.2 Nature and Extent of Contamination

The team shall conduct an extensive evaluation of the data. Data from the investigation shall be used to define the extent of lateral and vertical contamination. Constituents of concern and concentrations shall be identified and reported. In addition the direction and rate of groundwater flow shall be determined. Conclusions, including potential migration pathways, shall be supported with maps, cross-sections for depicting site hydrogeology, and diagrams. Furthermore, the report shall describe any additional compounds which may be of concern found during the investigation and their potential impact on the aquifer.

2.4.1.3 Fate and Transport Analysis

The team shall ensure that based on the data collected the fate of the compounds is defined. This shall be accomplished by interpreting data relating to natural attenuation parameters and other pertinent data, etc. Additionally, the report shall address the transport of identified Chemicals of Potential Concern (COPCs) and hydrogeological parameters that may affect transport of these chemicals. Modeling shall be used, if deemed appropriate, to assist in further defining COPC transport.

2.4.1.4 Refinement of Site Conceptual Model

Data analysis shall culminate with refinement of the conceptual site model (CSM) developed during the planning stage of the project (EM1110-1 1200). This resulting CSM will serve as a tool to focus discussions on relevant migration and exposure pathways in the RI report.

2.5 Task 5 – Baseline Risk Assessment (BLRA)

A baseline risk assessment shall be conducted to characterize current and future potential risks posed by contamination at the site. The BLRA shall consist of human health and ecological evaluations. The BLRA shall identify potential receptors and media-specific completed exposure pathways for risk quantification. It is assumed that only the human health evaluation will require risk quantification. Based on location and surrounding conditions, the site does not provide adequate habitat for significant or sustained ecological exposures. Current EPA and USACE guidelines shall be followed and the human health evaluation will be organized into the following major components:

- Selection of Chemicals of Potential Concern;
- Toxicity Assessment;
- Exposure Assessment;
- Risk Characterization and Uncertainty

Based on results of the BLRA, contaminant risk drivers and receptor populations will be identified for development of remedial goals.

2.6 Task 6 – RI Report

The project team shall prepare the RI Report according to guidance established in U.S. EPA, Office of Environment and Remedial Response, October 1988, OSWER Directive No. 9355.3-01, ***Guidance for Conducting RI/FS Studies Under CERCLA.*** The RI reports shall contain, but are not limited to, Data Evaluation, Nature and Extent of the Contamination, Fate and Transport of the Contamination, Baseline Risk Assessment, an identification of all potential ARARs and Preliminary Remediation Goals (PRGs). There will be three separate submittals of the RI Report the Pre-Draft Data Package Summary, Draft RI and Final RI. Each draft submittal shall be reviewed and accepted by the USACE Independent Review Team (IRT) prior to issuing the document to AEC and the

regulatory community.